REMARKS

Claims 1, 2, and 5-18 are pending in this application. Claims 1, 6, 9, 13, and 16 are amended to clarify the specific variables used in calculating the claim-recited B/R ratio, and claim 18 is amended for correct antecedent basis. Applicants request reconsideration and allowance in view of the following remarks.

Entry of Amendments

As noted, claims 1, 6, 9, 13, and 16 are amended to clarify the specific variables used in calculating the claim-recited B/R ratio. In particular, the specific radius used to calculate the ratio is the <u>active</u> radius R as defined in the specification at, for example, paragraph **[0048]** – not the total rotor radius. In the specification, an <u>active</u> radius is the only radius considered and therefore is "the radius" that has been claimed all along; therefore, the addition of "active" modifying "radius" is to more clearly specify this fact and to highlight that the claimed radius is the same active radius exclusively described. Accordingly, Applicants submit that this amendment does not necessitate further searching and therefore respectfully request entry of the amendments after Final.

Claim Objection

Claim 18 is objected to for an antecedent basis issue. Appropriate correction has been made, and the objection is overcome.

Claim Rejection

Claims 1, 2, and 5-18 are rejected under 35 U.S.C. § 103(a) as being obvious based on Dagh et al. (US. 5,568,846) in view of Tasker et al. (U.S. 5,855,416) and in view of Okayama et al. (U.S. 6,620,860), Wirth (DE 4133593), or Kappich (DE 19507102). Turning to the central issue of the matter, the Examiner asserts that each of Okayama et al. (which the Examiner asserts shows a ratio of 0.30), Wirth, and Kappich "recognizes the relationship [of brake lining extent, brake rotor radius, and wear/fracture resistance] and its significance [such that it] would have

been obvious to one of ordinary skill in the art to modify Dagh et al. by routine experimentation to optimize the ratio of B/R as per Okayama et al., Wirth and Kappich…to arrive at the most suitable disc brake for the environment and application at hand with reduced vibration." Applicants firmly refute the Examiner's assertion for several reasons.

First, Applicants reassert that, but for hindsight-driven reconstruction, one having skill in the art would not have looked to Okayama for guidance regarding the relative proportions of the various components of a braking system, e.g., the rotor and the lining. As pointed out previously, Okayama is directed toward the composition, per se, of a friction material to be used, for example, in brakes, clutches, etc. See, for example, the Abstract, the claims, and column 1, lines 5-11 of Okayama. Okayama is wholly unconcerned with the size of the material vis-à-vis a rotor against which it is to be applied. Furthermore, the apparatus shown in Figure 3 (as well as Figure 2) of Okayama, on which figure the Examiner has pinned the rejection, is simply a test apparatus. Although Okayama does indicate the dimensions of the friction material and the rotor of the test apparatus, Okayama is silent as to any real-world, in-use significance of those dimensions. Accordingly, Applicants submit that, without hindsight-based picking and choosing of features, one having skill in the art would not have arrived at the claim-recited ratio using Okayama as a starting point.[1]

Second, contrary to the Examiner's assertion, Okayama et al. does not exhibit a B/R ratio that is less than 0.38. Rather, taking the horizontal width (10mm) of the friction material as the claim-recited radial extent B of the brake lining as the Examiner has done and an active radius R

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[1] The hindsight-based, list-of-ingredients approach the Examiner has taken is further evidenced by his inclusion of Tasker et al. in the "mix" of references. The Examiner cites Tasker et al. simply because it refers to vehicles having axle weights of six and one-half to seven tons and vehicles having axle weights of about twelve and one-half tons (weights that are recited in the claims). That reference to weights, however, is in the context of applying the subject matter of the Tasker et al. disclosure – an axle sleeve configuration – to vehicles of such weight. See column 5, line 60 through column 6, line 57 of Tasker et al. (the Examiner-referenced portion of the reference). It has nothing whatsoever to do with the relative proportions of the brake lining and the active radius of the rotor and avoiding wear/fracture problems. In fact, Tasker et al. does not even mention brake pads or linings in the entirety of its disclosure. Thus, Tasker et al. is wholly inapposite to Applicants' claimed invention, its reference to vehicle tonnages notwithstanding, and its inclusion in the reference illustrates the hindsight with which the applied combination of references has been cobbled together.

of 20.43 mm^2 – calculated using the Pythagorean theorem and assuming the friction material is centered at a radius of 14 mm (Okayama's referenced "effective braking radius R"), as shown below – yields a B/R ratio of 0.49. That is well above the claim-recited value of 0.38.[3] Thus, even if Okayama were properly included in the "mix" of references – a point Applicants contest as set forth above – the specifically claimed invention would not be obtained.

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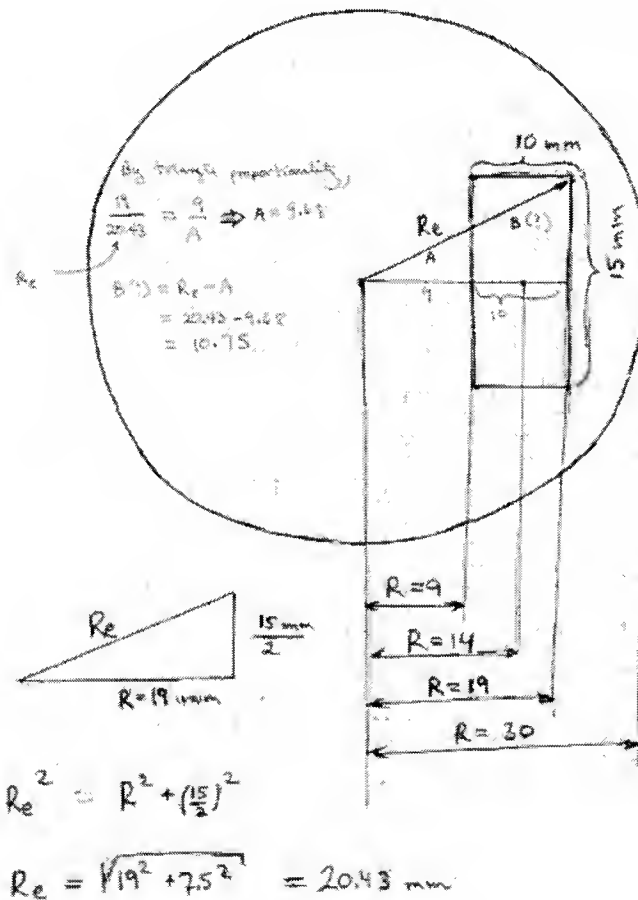
[2] The value of 25.15 Applicants previously calculated for Okayama's active radius was in error.

[3] The correct value to use for radial extent B may actually be the larger dimension along a radius, from where the radius crosses the inner side of the friction material to one of the outside corners of the friction material. That value – 10.75 mm and calculated as shown in the diagram – yields a B/R ratio of 0.52, which is even larger than what would be obtained using the Examiner's

Third, contrary to the Examiner's assertion, Okayama, Wirth, and Kappich do not "recognize[] the [B/R-wear/fracture resistance] relationship and its significance." As noted above, Okayama is concerned with the material, per se, of the friction pads – not the relative geometries of the pads and the rotors. Thus, although Okayama does identify certain dimensions of the disclosed testing apparatus and the test samples, there is no disclosure whatsoever as to why those particular dimensions were chosen. Accordingly, Okinawa does not recognize the relationship which Applicants have discovered or anything close to the significance thereof.

Similarly inapposite are Wirth and Kappich. The basic English-language abstract of Wirth indicates that "[t]he friction face of the [friction] element takes the form of a circular annulus, which has a linearly increasing or decreasing relation from the lining arc length (r) to the circumference (2r)." The English-language abstract of Kappich, on the other hand, indicates that "[t]he ratio of the length (L1) of the lining to the circumference (U) of the disc, is varied through the choice of the former, in order to reduce the resonant frequency of the squeaking of the brakes which is independent of the applied brake pressure." Applicants fail to see how the Examiner can maintain that either of those passages amounts to disclosure of a relationship between the radial extent B of the brake lining, the active radius R of the rotor, and the wear/fracture properties of the brake lining (not to mention disclosure of a preferred value thereof).[4]

Fourth, the claimed invention would not have been obvious as mere experimentation with/optimization of various parameters. Lacking any definitive evidence to show that one having skill in the art would have designed a brake pad/rotor with the geometric relationship Applicants have invented and claimed, the Examiner discounts the claimed features as being merely a design choice or a variable to be optimized through routine experimentation. But the question remains, "Optimized in what regard or to achieve what end?" The fact is, Applicants are unaware of any teaching – and the Office has pointed to none – recognizing that brake wear can be improved on by providing a brake liner and rotor in which the relationship between axial

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interpretation of the horizontal width of the friction material as constituting the radial extent of the friction material.

extent of the liner and the active radius of the rotor is less than a specified value. In the recent Supreme Court decision in *KSR International Co. v. Teleflex Inc.*, the Court referred several times to <u>predictability</u> of a result as being a touchstone of obviousness. Here, the Examiner has cited nothing to show that the result Applicant has achieved would have been predictable or, it follows, that the route to that result (which is the precise thing Applicant is claiming) would have been obvious. In view of that deficiency, the Examiner's rejection is fundamentally flawed – it does not properly support a *prima facie* case of obviousness – and therefore must be withdrawn.

In view of the foregoing, Applicants submit that all claims are in condition for allowance, and timely Notice to that effect is respectfully requested.

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The undersigned representative requests any extension of time that may be deemed necessary to further the prosecution of this application.

The undersigned representative authorizes the Commissioner to charge any additional fees under 37 C.F.R. 1.16 or 1.17 that may be required, or credit any overpayment, to Deposit Account No. <u>14-1437</u>, referencing Attorney Docket No.: <u>0173.043.PCUS00</u>.

In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner may directly contact the undersigned by phone to further the discussion.

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[4] If the Examiner is relying on some other passages from the reference and has English-language translations of the relied-upon passages, it is requested that he advise Applicants of the relied-upon passages and supply Applicants with the English-language translations thereof.